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# PATENT SPECIFICATION

DRAWINGS ATTACHED

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914,203

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## COMPLETE SPECIFICATION

### Improvements in or relating to Sliding-Clasp Fasteners

We, F.P.S. (RESEARCH & DEVELOPMENT) LIMITED, a British Company of Staplehurst Road, Sittingbourne, Kent, do hereby declare the invention for which we pray that a Patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention concerns improvements in or relating to sliding clasp fasteners and has for one object the provision of an improved fastener, particularly suitable for use as a closure in a container or covering for protecting articles which would be subject to deterioration if exposed to the atmosphere for any substantial length of time.

According to the present invention there is provided a sliding clasp fastener which comprises co-operating flexible male and female fastener strips wherein the male strip has a mating rib of downwardly barbed or hook-shape and the female strip has a correspondingly shaped mating groove for interlockingly receiving the hook-shaped rib, and wherein the lower parts of the fastener strips are chamfered to provide a longitudinally extending gap at the lower surface of the strips when these are interlocked together, this gap providing for an outward rolling of the strips about a longitudinal and downwardly moving axis as compressive inwardly and downwardly directed pressure is exerted transversely of the interlocked strips near their bases.

The male strip may have an auxiliary groove formed above the hook-shaped rib and in such case the female strip will have an auxiliary mating rib for interlocking engagement with the auxiliary groove. With this arrangement, as the strips are urged together near their bases the auxiliary rib is first withdrawn from the auxiliary groove thus rendering the upper shoulder of the principal groove of the female strip more flexible so that the withdrawal of the hook-shaped rib is facilitated.

Preferably the hook-shaped rib has a shall-

low longitudinally extending rib or pip at its upper surface and this pip serves to restrict the mouth of the auxiliary groove referred to above.

Although the strips described above can be opened and closed manually this is a time consuming operation, particularly when a considerable fastener length is to be opened or closed.

Preferably therefore, a sliding clasp for opening and/or closing the strips is provided and according to another feature of the invention the strips are formed at their outer surfaces with longitudinally extending channels or grooves for the reception of inwardly directed parts carried by a saddle shaped clasp formed to straddle the strips.

According to another feature of the invention a groove on the outer surface of the male strip is positioned substantially centrally of the height of the strip while a groove on the outer surface of the female strip is positioned adjacent the lower part of the strip. The clasp can then carry an inwardly projecting pair of upwardly inclining opening prongs, the prongs being formed to engage with the grooves and to exert, when the clasp is moving along the strips, an inwards downwards compressive pressure to the strips to urge them apart with the downward and outward rolling action referred to above.

Preferably the sliding clasp will carry a downwardly projecting strip separating element to urge the strips apart after they have been initially sprung open by the opening prongs referred to above.

Conveniently the sliding clasp includes at its end which is trailing when the clasp moves in a closing direction a pair of inwardly directed closure prongs preferably carried by an element having an internal configuration matching the external configuration of the fully interlocked strips. The elements and prongs will then urge the strips together into interlocking engagement with one another.

The sliding clasp may be longitudinally divided into two parts so that its width can be varied by shims and the clasp thus adapted to open fastener strips of different widths.

5 Preferably each fastener strip is provided with a longitudinally extending flange whereby the strip may be secured to the material of the article on which the fastener is to be used. For example each of the said flanges can  
10 have a deep longitudinally extending slot to receive a marginal edge portion of the material which can then be heat sealed or otherwise secured in the slot.

The strips described above are most convenient formed as extrusions of a thermoplastic resin, for example a vinyl chloride polymer or copolymer resin.

The sliding clasp fasteners according to the present invention are particularly useful for sealing the access openings of containers used for the storage and transport of objects which would otherwise be liable to deterioration when exposed to the atmosphere unprotected.

20 According to another aspect of the invention therefore, there is provided a container particularly for the purpose envisaged above and formed of a substantially moisture and moisture-vapour proof material including an access opening closable by a sliding clasp  
25 fastener as described above.

30 Preferably the material includes a moisture and moisture-vapour proof barrier layer. For example, the material may be that described in our Patent No. 887,956.

35 In order that this invention may more readily be understood and further features thereof appreciated, one embodiment of the sliding-clasp fastener according to the invention will now be described by way of example  
40 with reference to the accompanying drawings in which:—

Figure 1 is a fragmentary perspective view, partly in section, of a container employing the sliding-clasp fastener of this embodiment, this  
45 view showing the fastener strips, the clasp and the sealing hood at one end of the fastener;

Figure 2 is a perspective view illustrating the sealing hood at the other end of the  
50 fastener;

Figure 3 is an underneath perspective view showing one end of the junction of the fastener with the material of the container in which it is provided;

55 Figure 4 is an exploded perspective view of the clasp of the fastener;

Figures 5 and 6 are perspective views showing stages in the assembly of the clasp on the fastener; and

60 Figures 7, 8 and 9 are sections through the fastener illustrating the action of the clasp in opening, and closing the fastener.

The embodiment illustrated in the drawings is a sliding-clasp fastener particularly suitable  
65 for use in a flexible moisture proof container,

e.g. a container formed of the material described and claimed in our Patent No. 887,956 (Cognated Applications Nos. 220/57 and 10216/57), such material comprising a moisture and moisture vapour barrier layer of lead  
70 foil to each side of which is adhered a sheet of fabric reinforced flexible corrosion-resistant heat-sealable material.

Referring now particularly to Figures 7—9 of the drawings, it will be seen that one of  
75 the fastener strips 1 (hereinafter referred to as the "male strip") includes a rib 4 having a downwardly barbed or hook-shaped portion 35 while the other strip 2 (hereinafter referred to as the "female strip") comprises a groove 6  
80 having an upwardly directed barbed or hook-shaped portion 36 so that the groove 6 is shaped to receive the rib 4.

The male strip 1 also includes above the rib 4 an auxiliary mating groove 3 having a constricted mouth. The female strip 2 has above the groove 6 a narrow-necked auxiliary rib or bead 5 for mating engagement with the groove 3. A groove 38 forming the lower  
85 narrowing of bead 5 engages the lower part of the constriction of the mouth of the groove 3 which is defined by a shallow longitudinally extending pip or rib 37 at the upper surface of rib 4. The lower parts of the strips 1 and 2 are chamfered at 1a and 2a to define, when the strips are interlocked together as shown in  
90 Figure 7, a longitudinally extending gap 39.

Each of the fastening strips has along its outer edge an outwardly projecting flange 7 having therein a deep longitudinal slot to receive a marginal edge portion 8 of the piece  
100 of material 9 used in forming the container in which the fastener is provided.

As previously explained, the fastener is particularly suitable for use in a container or covering formed of a heat-sealable material and, in this case, it will be appreciated that the fastener parts above described may be secured to such material by heat sealing the marginal edge portions 8 of the latter in the  
105 slots in the flanges 7.

In addition, the outer edge of the male fastener strip 1 is provided, at a position substantially centrally of its height, with a longitudinally extending groove or channel 10 and the outer edge of the female fastener strip 2 is provided, near its base, with a longitudinally extending groove or channel 11.

The sliding clasp of the fastener comprises a saddle shaped member 12, the arms 13 of which straddle the two fastener strips. The saddle 12 is longitudinally divided centrally of the arms 13 so as to comprise two separable portions, which in use of the clasp are bolted together by bolts 14, one or more shims  
120 15 being provided between the two portions to enable the width of the clasp to be adjusted to the dimensions of the fastener strip and standard parts thereby used for fastener strips of different dimensions.

At the end which is the trailing end when the clasp is moved in its opening direction, the clasp is provided with two elements in the form of plates 16 and 17 secured to the member 12 by screws 18 and 19 respectively. The apertures 20 through the plate 17 are elongated in the direction of the width of the clasp so as to allow for alteration of the lateral position of the screws which occurs when the width of the clasp has to be adjusted. The plate 16 is formed in two halves to allow for this adjustment of width.

The plate 16 has extending outwardly from each side thereof a projection or prong, one projection, indicated by reference 21, being adapted to engage in the groove 10 in the fastener strip 1 and the other projection indicated by the reference 22, being adapted to engage in the groove 11 of the other fastener strip 2. The projections 21 and 22 are upwardly inclined so that when the clasp is moved along the fastener strips the projections exert downward and inward compressive pressure as illustrated in Figure 8.

The plate 17 has extending inwardly from its upper part a strip separating element 23 adapted to extend inwardly between the fastener strips for part only of the depth thereof, this projection 23 having two prongs or fingers 24 (Figure 9) which are adapted, in opening of the fastener, to engage in the grooves 3 and 6. At its other end, the saddle 12 has secured thereto by screws 25 an element in the form of a plate 26 which is, like the plate 16, formed in two halves and has an internal configuration matching the external configuration of the fully interlocked fastener strips, side fingers or prongs 27 and 28, projecting inwardly to engage in the grooves 10 and 11 respectively of the fastener strips.

To enable the clasp to be more easily gripped in moving the clasp along the fastener strips, the end portions of the fastener strips at each end of the fastener are covered by a hood 29, preferably formed of the same material as the fastener strips, the latter being secured, e.g. heat-sealed, to the hood and the hood being secured, e.g. heat-sealed to the material 9. Each hood 29 comprises a hollow moulding of substantially semi-cylindrical form having a closed end and a flange 30 by which the hood is secured to the material 9 and fastener strip flanges 7. The hood 29 at the closed end of the fastener, i.e. the end away from which the clasp is moved in closing the fastener, is shown in Figure 1 and has an internal configuration matching the external configuration of the fully interlocked fastener strips. The hood 29 at the open end of the fastener, i.e. the end away from which the clasp is moved in opening the fastener, is shown in Figure 2 and has an internal configuration similar to that of the plate 17 which abuts this hood when the fastener is closed. As shown in Figure 3, at each end, internally

of the material to be joined by the fastener, the fastener strips are heat-sealed together as shown at 31 over a short-length, e.g. 3 inches, and a panel 32 of heat-sealable material is secured to the material 9 so as to extend across the end of the fastener.

The operation of the sliding-clasp fastener above described will be appreciated from Figures 7 to 9 which show the actions of the plate 26 in closing the fastener and the plates 16 and 17 in opening the fastener.

In opening of the fastener as the clasp is moved along the fastener strips the projections 21 and 22 engage the grooves 11 and 10 to exert downward and inward compressive pressure to the strips so that, as illustrated in Figure 8, the strips pivot away from one another about an axis at 34 as illustrated in Figure 8. It will be seen that the rib 4 has begun to lift out of the groove 6 so that the hook portion 35 moves out of engagement with the hook portion 36. As the clasp moves along the strips the pivoting axis moves downwardly and the rib is progressively lifted until the hook-shaped part 35 is substantially clear of the hook-shaped part 36. The strip separating element 23 then enters between the strips and its fingers 24 enter respectively into the groove 6 and the auxiliary groove 3. The strips are then pushed apart.

It will be appreciated that the downward and inward compressive pressure exerted by the prongs 21 and 22 could be exerted manually and the strips thus broken apart by hand. Separating the strips can then be carried out by any strip separating element, the strips 1 and 2 being easily separable by an element entering completely between them and moving longitudinally in the strips.

While downward and inward compressive pressure will act to spring the strips apart with the above described rolling action, inward compressive pressure in a horizontal direction will urge the strips together into interlocking engagement, this interlocking being achieved in the embodiment being described by the plate 26 which has an internal configuration corresponding exactly to the external shape of the fully interlocked fastener strips. The interlocking is thus carried out by pressure applied over the external shape of the strips, the prongs 27 and 28 serving to hold the clasp on the strips. In closing of the fastener, the two strips of the latter are brought, and pressed, together within the saddle 12, the final interlocking of the two parts being achieved by the plate 26 since the internal configuration of the latter exactly corresponds to the external shape of the fully interlocked fastener strips.

The sliding clasp and plates 16, 17 and 26 may be formed of any suitable material and may, for example be formed of stainless steel, or as injection mouldings of molybdenum disulphide loaded nylon.

It will be appreciated that the fastener above described may be used in articles formed of materials other than that particularly mentioned and may, for example, be used in articles formed of polyvinyl chloride covered fibre glass or any other convenient suitable material having an outer surface of heat sealable material.

If desired, the said clasp may be provided, in addition, or alternatively, to the said serrations with a handle to facilitate movement of the clasp along the fastener strips. Further, the clasp may be provided internally with rollers rolling in longitudinal grooves in the outer edges of the fastener strips. Such rollers could provide the prongs 21 and 22 of plate 16 and/or the prongs 27 or 28 of plate 26.

#### WHAT WE CLAIM IS:—

1. A sliding clasp fastener which comprises co-operating flexible male and female fastener strips wherein the male strip has a mating rib of downwardly barbed or hook-shape and the female strip has a correspondingly shaped mating groove for interlockingly receiving the hook-shaped rib and wherein the lower parts of the fastener strips are chamfered to provide a longitudinally extending gap at the lower surface of the strips when these are interlocked together, this gap providing for an outward rolling of the strips about a longitudinal and downwardly moving axis as compressive inwardly and downwardly directed pressure is exerted transversely of the interlocked strips near their bases.

2. A fastener as claimed in claim 1 wherein the male strip has an auxiliary groove formed above the hook-shaped rib while the female strip has an auxiliary mating rib for interlocking engagement with the auxiliary groove the arrangement being such that as the strips are urged together near their bases, the auxiliary rib is first withdrawn from the auxiliary groove thus rendering the upper shoulder of the groove of the female strip more flexible and facilitating the withdrawal of the hook-shaped rib.

3. A fastener as claimed in either claim 1 or claim 2, wherein the hook-shaped rib has a shallow longitudinally extending rib or pip at its upper surface.

4. A sliding clasp fastener as claimed in either claim 1 or claim 2 wherein the fastener strips are formed at their outer surface with grooves for the reception of inwardly directed parts carried by a saddle-shaped clasp formed to straddle the strips.

5. A fastener as claimed in claim 4 wherein the groove on the outer surface of the male

strip is positioned substantially centrally of the height of the strip and the groove on the outer surface of the female strip is positioned adjacent the lower part of the strip, and the clasp carries an inwardly projecting pair of upwardly inclined opening prongs, the prongs being formed to engage with the grooves and to exert downward and inward compressive pressure to the strips.

6. A slide fastener as claimed in claim 5 wherein the sliding clasp carries a downwardly projecting strip separating element to urge the strips apart after they have been initially opened by the opening prongs.

7. A sliding clasp fastener as claimed in claim 6 wherein the strip separating element includes a pair of outwardly and downwardly directed prongs extending respectively into the groove of the female strip and the auxiliary groove of the male strip.

8. A sliding clasp fastener as claimed in any of claims 5—7 wherein the sliding clasp includes a pair of inwardly directed closure prongs shaped to engage with the said grooves on the outer surface of the strips to urge the strips together into interlocking engagement.

9. A sliding clasp fastener as claimed in claim 8 wherein closure prongs are carried by an element having an internal configuration matching the external configuration of the fully interlocked strips.

10. A sliding clasp fastener as claimed in any of claims 5—9 wherein the sliding clasp is longitudinally divided into two parts.

11. A sliding clasp fastener as claimed in any of the preceding claims wherein each fastener strip is provided with a longitudinal flange by which the strip may be secured to the material of the article on which the fastener is to be used.

12. A sliding clasp fastener according to claim 11 wherein each of the said flanges has a deep longitudinally extending slot to receive a marginal end portion of the material.

13. A sliding clasp fastener as claimed in any of the preceding claims wherein the strips are formed as extrusions of a thermoplastic synthetic resin, for example, a vinyl chloride polymer or copolymer resin.

14. A container for corrodible objects formed of a substantially moisture and moisture-vapour proof material and including an access opening closable by a sliding clasp fastener as claimed in any of the preceding claims.

15. A container as claimed in claim 14 wherein the material includes a moisture and moisture-vapour proof barrier layer.

16. A sliding clasp fastener substantially as herein described with reference to and as shown in the accompanying drawings.

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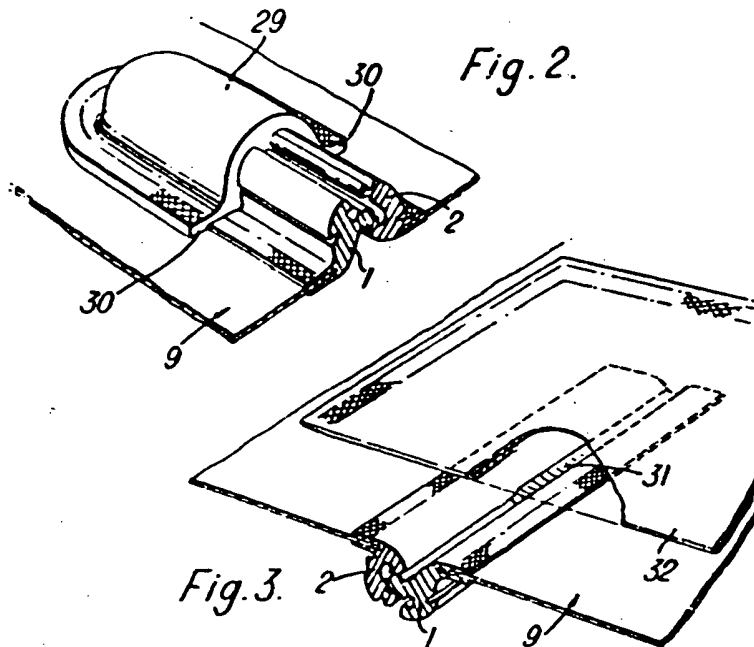
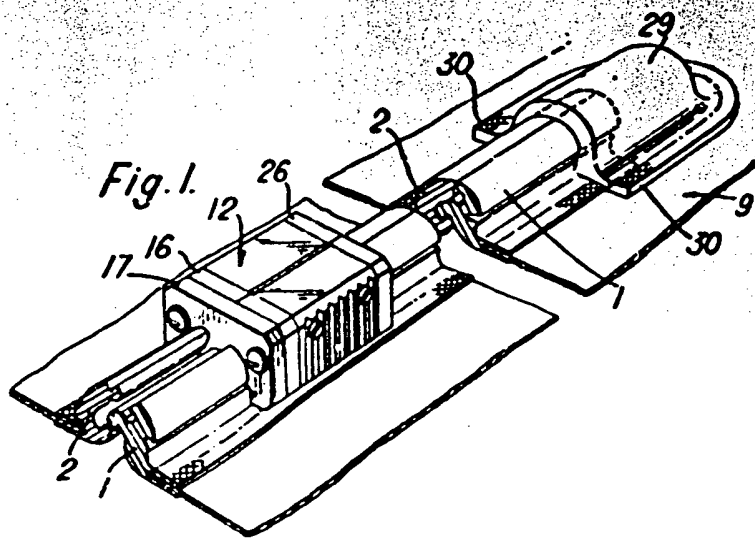
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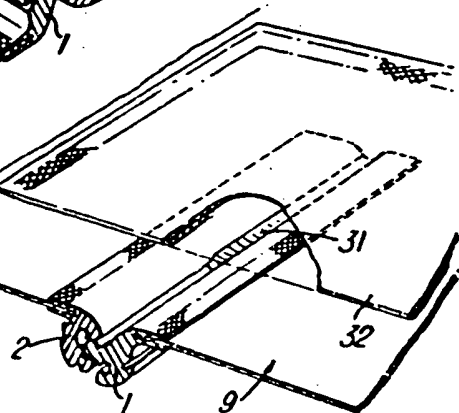
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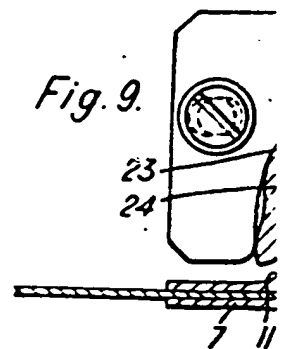
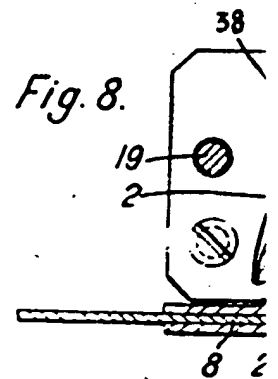
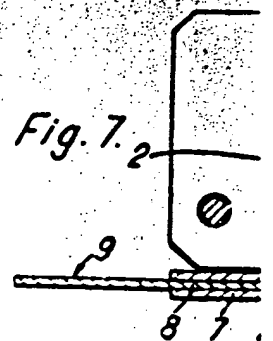
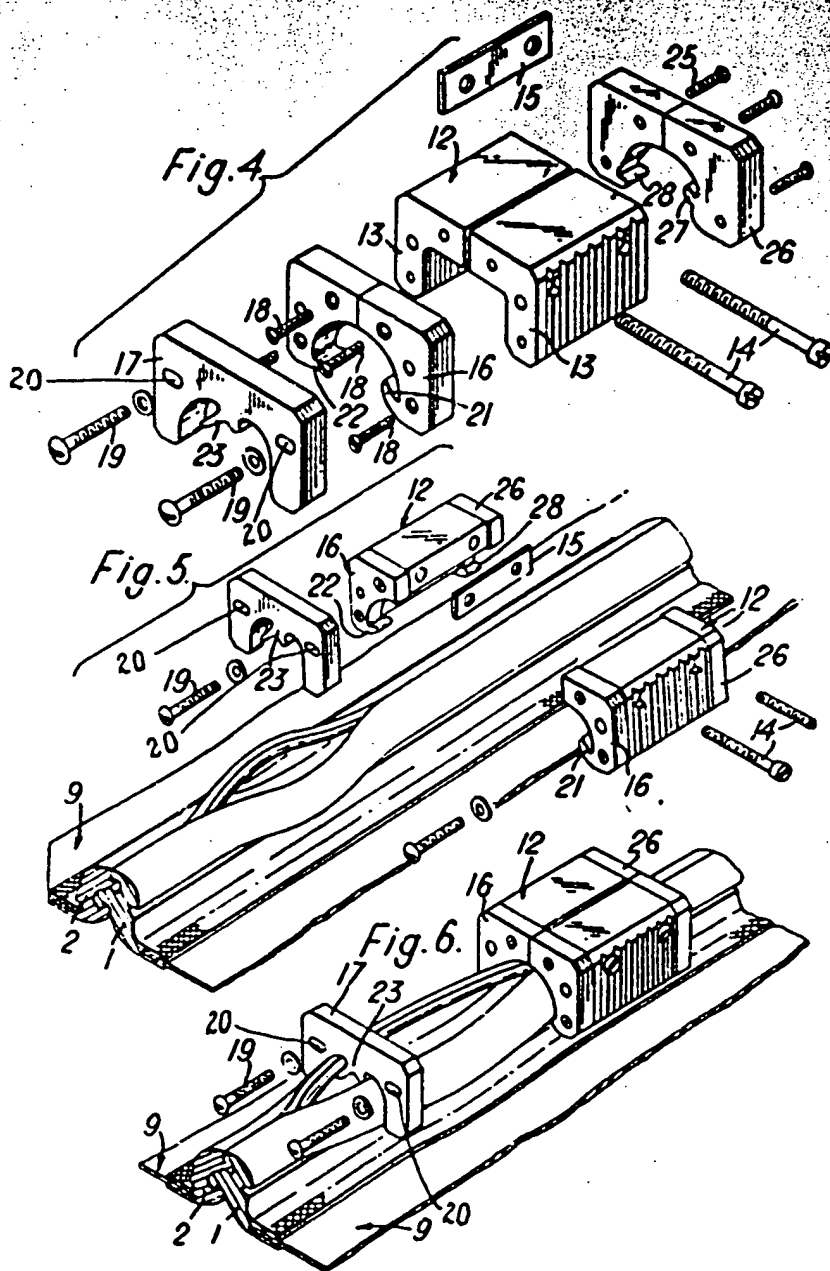
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*Fig. 3.*







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